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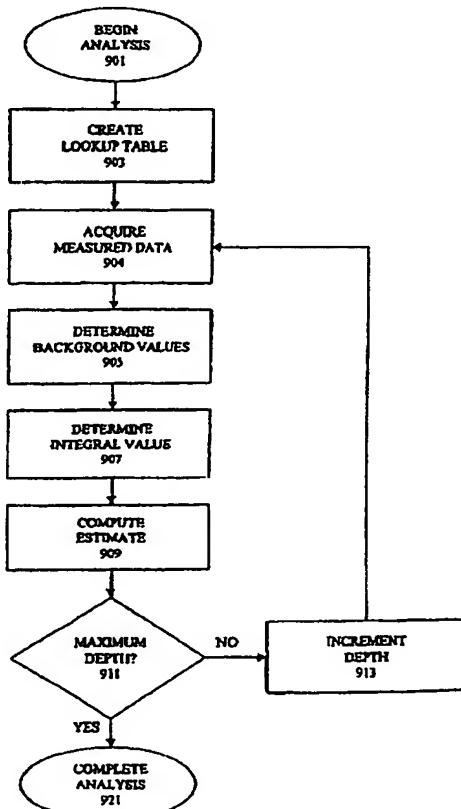
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(54) Abstract Title  
**Determining earth formation resistivity by attenuation and phase shift measurements**

(57) A resistivity measurement technique estimates a first value for a first electrical parameter consistent with an assumption that each property of a measured electrical signal senses the first electrical parameter and a second electrical parameter in substantially the same volume and estimates a second value of the first electrical parameter consistent with the estimated first value and consistent with each property of the measured electrical signal sensing the first electrical parameter and the second electrical parameter in different volumes. Applying this technique, a phase conductivity may be determined from only a phase shift measurement. An attenuation conductivity may then be determined based on an attenuation measurement and the phase conductivity. Since bandwidth is limited in data telemetry to an earth surface while drilling, phase shift measurements can be telemetered without attenuation measurements for accomplishing resistivity measurements.



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